MEMORANDUM

EVALUATION OF TRIPLE SIMULTANEOUS
PARALLEL ILS APPROACHES SPACED 4000 FT APART
USING THE FINAL MONITOR AID AND A SIMULATED ASR-9 RADAR
WITH A 4.8 SECOND UPDATE RATE

April 9, 1996

The Multiple Parallel Approach Program (MPAP) Technical Working Group (TWG) commissioned two real-time Air Traffic Control simulations at the FAA Technical Center in September 1991 and July 1992. The simulations were designed to examine the air traffic control procedures for simultaneous Instrument Landing System (ILS) approaches to three runways spaced 4000 ft apart. The studies were part of an on-going effort to evaluate increases in air traffic capacity using multiple simultaneous parallel ILS approaches. Due to insufficient data collection and errors in flight simulator data transmission, the simulations could not be analyzed properly. Accordingly, the MPAP TWG was unable to develop a recommendation concerning this operation.

The airport configuration examined had three parallel runways spaced 4000 feet (ft) apart. An ASR-9 radar system with a 4.8 second (s) update rate, accurate to within 2 milliradians, was simulated. High resolution color displays with alert algorithms were used by controllers staffing the approach monitor position. The air traffic consisted of both flight simulators and computer generated aircraft which emulated a high density operation of turbojets, turboprops, and reciprocating-engine aircraft.

To study the safety of the proposed operation, conflicts were developed between aircraft. The conflicts were generated by having an aircraft deviate from the localizer by either 20 or 30 degrees toward the path of an aircraft on an adjacent approach. To create worst case scenarios, these “blundering” aircraft simulated a loss of radio communication with the controllers in a majority of the conflicts.

The MPAP TWG established two measures in evaluating the proposed operation:

1. Can controllers prevent conflicts from resulting in a miss distance of less than 500 ft?

2. Do the controllers, controller observers, and ATC management observers agree that the proposed simultaneous approach operations are acceptable, achievable, and safe?

Data transmission from the flight simulator sites had irregularities in position reporting which affected the calculation of the aircraft miss distances. It was however determined that there were several blunders which resulted in miss distances of less than 500 ft. However, the exact number of test criterion violations (TCVs) was indeterminable.

In the controller report, the controllers indicated that the tested operation was "acceptable and safe". It should be noted however, the controllers were not informed of their performance in terms of resolved conflicts.

Due to the problems identified in the simulation data the TWG could not make recommendations about simultaneous ILS approaches to three runways spaced 4000 ft apart. Until the MPAP TWG has conducted additional analyses or simulations of this procedure, this investigation shall be rendered closed.